Regional Dimensions of the Triple Helix Model

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Abstract:

This paper introduces the rationale and the articles in this special issue bridging the literature on regional development and the triple helix model. The concept of the triple helix at the sub-national, and specifically regional, level is established and examined, with especial regard to regional economic development founded on innovation and research activities. The discussion on regional competitiveness lays the foundations for the exploration of contrasting environments, sectors and administrations. We offer a framework that captures the array of institutions, driving factors, players and powers active at the regional level. In this introduction we present and summarise the collection of articles emphasising their contribution to the literature. We demonstrate how the articles in this selection exploit the triple helix model for analysis of the delivery of policy at a regional level, and describe how other models and characterisations of interactions and collaborations between institutions are being associated with the triple helix concept, highlighting their shortcomings and the way they enrich its application.

Keywords: triple helix; innovation; regional governance; public policy; regional economic development

1. Introduction

This special issue brings together two currently disconnected problematic: one of regional development, growth and competitiveness, and another of the triple helix model for university-industry-government interactions as a contender to and a successor of the concept of National Innovation Systems (NIS). The notion of NIS emerged in the late 90s and was popularised with the OECD work on developing indicators to measure innovation in firms, networks and clusters at a country level on a comparative basis (OECD, 1999). Among the key challenges addressed in this report were how to measure the innovative capacity of firms, their technology inputs and outputs, the proportion of acquired vs developed new technologies, inter-firm relationships, university-industry knowledge transfer and partnerships, public-private sector interactions and knowledge flows in general, mapping the institutional linkages within some geographic boundaries. In terms of policy implications, these studies firmly concluded that there was a clear role for government intervention in building innovative culture, enhancing technology diffusion, promoting networking and clustering, leveraging research and development across sectors, responding to

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globalisation, attracting foreign direct investment, and learning from best practices (OECD, 1999). These developments paved the road for a wider acceptance of the role of government intervention even in the most competitive market economies, such as in the UK. They also facilitated for the acceptance of the triple helix model as a representation of the complex relationships between government-industry-university.

Almost at the same, with the growth of regionalism in Europe and the launch of more formalised European Structural Funds in 1994-1996, the incentives for special government interventions in supporting regional and industrial cluster growth were put in place (Lagendijk. and Charles, 1999). This European platform transformed regional governments into strategy developers and facilitators, promoting the regional attractiveness for foreign direct investment, building regional capabilities to enhance the skills base and the local labour market, fostering connectivity between the local suppliers and the foreign markets, as well as enhancing innovation infrastructure and open public and community spaces. Many of these new roles for regional authorities were directly financed through national policies and investment programmes, and hence were attributed to the efforts of central government, although effectively they were delivered locally. The regional authorities hence were enrolled as implementers, building stakeholder coalitions to deliver the policy outcomes (Danson et al., 1999).

Around that time, the triple helix model was formulated as an analytical tool, enabling actors to reflect on the complex relationships that emerge at the public-private interface. Etzkowitz and Leydesdorff (2000) in their seminal 'Research Policy' paper, explained the policy dynamics behind the change in perspective on the role of government in the innovation process, and at the intersection of knowledge and commercial activity. In the triple helix framework the government evolved from a regulator to become a facilitator, entangled in the university-industry connection, and triangulating mutual learning and self-enforced interdependencies between public and private sector innovators.

As the triple helix model conceptualises the national level of the innovation system, its subsequent theoretical elaboration has continued to articulate the same level of analysis – government policies, national higher education system (universities), and national (domestic) industries. The triple helix practice, however, has been diverging in a different direction – focusing on the local implementation level. Over the period since the early 1990s, there has been a proliferation of business support to the economic system, targeting on improving the innovative capacity of regional economies, utilising both spatial and non-spatial measures (Lagendijk. and Charles, 1999). Included in the leading spatial initiatives have been

investing in technology parks, research centres and incubators where regional stakeholders co-align to pool the necessary resources and to demonstrate impact.

These regional triple helix dynamics often were attributed to activities by the regional universities, which led to the promotion of the concept of the 'entrepreneurial university'. Etzkowitz and Klofsten (2005) argue that during the first 'inception' phase of innovative regions, universities play the most critical role – whether these are existing academic institutions or new establishments. At the second stage of 'implementation', the university-government link recedes to the manifestation of a stronger university-industry link. The third phase of 'consolidation' of innovation capacity in regions requires self-reinforcing dynamics across the triple helix, creating a sustainable model of stakeholder engagement and gaining or retaining competitiveness on a broader scale.

Etzkowitz and Klofsten (2005) argue that as one technological paradigm is exhausted another one is needed as the basis for new economic activity. During the fourth 'renewal' stage, the role of academia and government comes again to the front, creating the conditions for the next wave of innovation. Although this work acknowledges the difference in perspectives between the national and the regional levels, it does not offer significant conceptual clarity on what drives the regional dynamics. The notion of 'Regional Innovation Organiser', which is introduced by Etzkowitz and Klofsten, is abstract and does not envisage a specific institutional embodiment – such as firm, third sector organisation, educational establishment, incubator, technology transfer centre, or regional authority. The regional representation of the triple helix remains vague. This is in stark contrast with the notion of the regional development agency as a catalyst or *animateur* in the role of 'regional innovation organiser' as presented in the RDAs and regional economic development literature (see, for example, Morgan, 1998).

It is clear from the literature that innovation goes hand-in-hand with learning and investment. Although learning can be associated with regional universities, the sources of investment in R&D are hardly localised, but often globalised. National Innovation Systems, hence, to the extent they are funded by national governments and by the private sector, are prone to national and global knowledge and resource flows. This creates continuous tension for regional stakeholder initiatives, which have to attract capital usually from outside the region. In addition, scholars argue that regional / industry / disciplinary boundaries are constraints to innovation (Moulaert and Sekia, 2003), so the 'culture of permeability' is a necessary condition for innovating regions (Etzkowitz, 2012).

Current evaluations of national and regional innovation systems in Europe exhibit numerous elements of the uneven spread of incentives and innovation outcomes across European regional geography (European

Union, 2014). In recognition of this, the European Commission, in its economic policy for industrial renaissance in Europe, has put a strong emphasis on implementing specific instruments for regional development in support of innovation, skills, and entrepreneurship – as a milestone and a key priority for ensuring growth. Regional policy measures are closely observed, alongside with smart specialization strategies, regional cluster development and upgrading of innovation and skills. Regional and cluster initiatives facilitate at present the integration of EU firms in global value chains, or parallel strengthening of the internal market and its internationalization.

The triple helix practice, particularly in Europe, has predominantly demonstrated a Government-led approach in contrast with the model envisaging continuous alterations across the government-industry-university spaces (Etzkowitz and Leydesdorff, 2000). This raises numerous questions about the implementation of the triple helix model at the regional level. Does the regional context frame different relational dynamics compared with the national or international level? Are regional government-local business-local university clear descendants of the triple helix actors at a national level? How do regional constellations of triple helix actors engage in policy design and implementation? How are triple helix relationships enacted at a regional level and what is the cutting point of the vertical and horizontal interactions across the public and the private sector in a region?

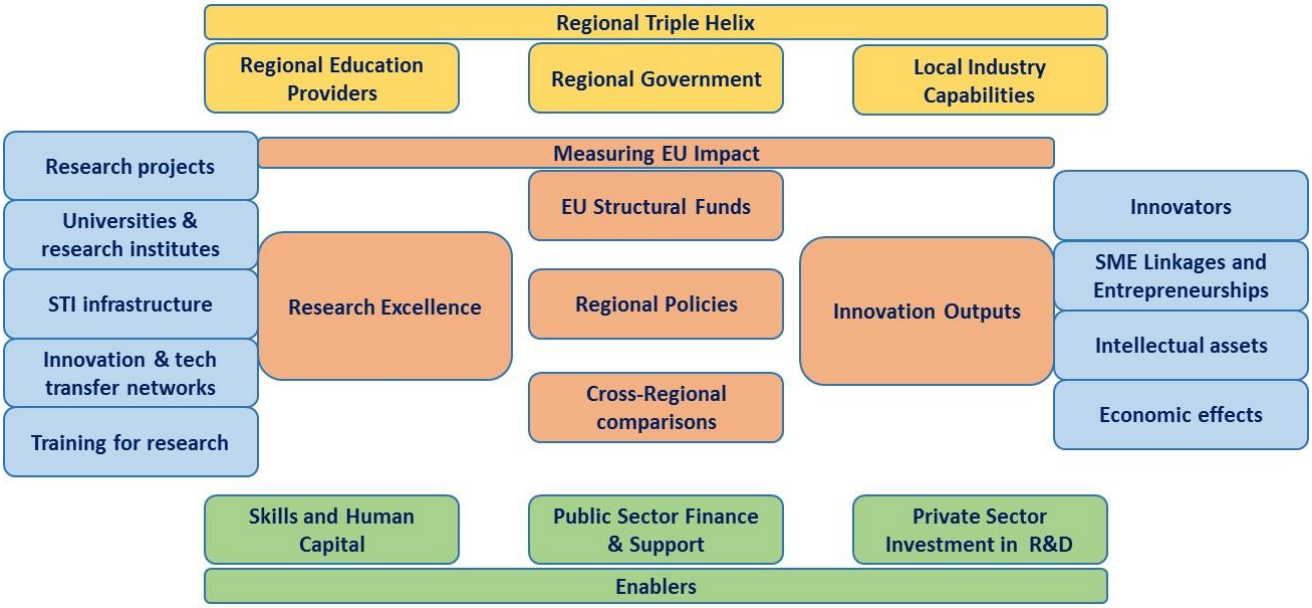
2. European Drivers for Regional Triple Helix Dynamics

This brief review of the historic foundations of the concepts of national and regional innovations systems, the triple helix, regional economic development and institutions suggests a complex and crowded landscape with organisations, policy framework, and drivers operating at different levels. Conflict analysis and resolution, stakeholder engagement and partnerships, institutional evaluation and impact analysis, assessment of governance and power relations have all been applied to understand such complexity and to steer a strategic route for policymakers and practitioners through this entanglement of actors and processes. Figure 1 offers a synthetic representation of the range of active players, resources and activities that drive change, and suggests some of the issues inherent to such a scrambled and competitive stage, particularly in European regions.

This array of policy actors and measures within the context of interdependence, endogenous growth, and a reliance on bottom-up regeneration initiatives (Danson and Lloyd, 2012), has encouraged regions and sub-national territories progressively to formalise their approach to economic development and competitiveness. The creation and strengthening of regional authorities such as Regional Development Agencies (RDAs), and partnerships with regional stakeholders to create institutional thickness and

capacity have been spreading and deepening across the European Union and beyond since the 1980s (Danson, Halkier and Bellini, 2012). The delivery of EU Structural Funds has paralleled this evolution to increasingly becoming formalised as regional level implementation of operational programmes, and absorption of funds acquired through transparent proposals and bidding (CEC, 2015).

Figure 1. Drivers for Regional Triple Helix Dynamics



Consistent with these changes has been the engagement of a wider set of players within the regional economy in established regions that drive competitiveness by drawing on and encouraging closer collaborations between the major indigenous resources and local assets. Figure 1 also illustrates some of the tensions in the regional triple helix model, and in particular – the development of evaluation methodologies for analysis of university and private sector innovation capabilities that require a global outreach. To understand better how these elements of the triple helix are being facilitated to cooperate below the level of the state, this special issue brings together studies from across Europe to illustrate some of the policies, initiatives and practices under formation and implementation.

3. Regional Dimensions of the Triple Helix Model: Concepts and Perspectives

The triple helix model itself represents a complex set of layers of actors and relationships, where the agglomeration effects are not a simple sum of micro-level outcomes (Moulaert and Sekia, 2003). The national system level exhibits substantially different drivers, actions and outputs, compared with the processes at regional level. The contributions in this special issue investigate specific aspects of the university–industry–government constellation in a number of European regions and countries. Authors

interrogate different elements of the triple helix model that induce regional differentiation effects (Table 1).

The series of papers starts with a theoretical piece by Danson and Todeva, which begins the discussion with the philosophical concept of governmentality as the organized practices (mentalities, rationalities, and techniques) through which governments try to produce policies and interventions best suited to fulfil citizens' aspirations. Through the concepts of governmentality, governance and administration the authors explain the entanglement of power, culture and practice as a distinctive regional triple helix context. The justification of this approach is adopted from the Europe-wide policy orientation towards regionalism and subsidiarity.

Table 1. Regional Dimensions of the Triple Helix Model: Concepts and Perspectives, by article in this special issue

Danson & Todeva	Aranguren, Guibert, Valdaliso, Wilson	Gustavsson	Gebhardt & Stanovnik	Kerry & Danson
Governmentality and regional governance; Structure of government; Regionalism and subsidiarity; Regional development agencies as Triple Helix actors; Value creation and value capture in the Triple Helix; Stakeholder coalitions	Academic institutions as catalysts of change; Globalisation and de-territorialisation of socioeconomic relationships; Knowledge and learning as a source of competitive advantage; University outputs and participation in the entrepreneurial process	Industrial and collaborative PhDs; Regional competitiveness, long-term and short-term benefits; Endogenous growth model; Critical success factors for university-industry collaboration	Multi-level governance of innovation; European regional innovation policy; Complex projects; Capability and capacity of government; Regional innovation strategies; Innovation clusters	Catapult innovation centres in the UK; Intermediaries; Sources of competitiveness; Innovation capacity

Danson and Todeva discuss how the structure of government generates a differential policy approach to regional economic growth, and what is the rationale for creating an institutionalized authority at the mezzo level to engage with local stakeholders and deliver localized solutions in terms of value creation and value capture. The paper makes an important observation that, from an institutional perspective, it is difficult to conceptualise regional government agencies and other regional institutions as having a unique and distinctive impact, as all of them are entangled in the policy implementation practice with multiple national, as well as localised stakeholders. Further, this introductory paper recognises that regional development agencies are leading stakeholders themselves. Allocative decisions at a regional

level generate value added, facilitating a maximum impact from investment decisions and government intervention. The triple helix context hence emerges at a regional level as a stakeholder forum between local businesses, education providers and administrative authorities and agencies.

The paper overall defends the remit for regional development agencies as guardians of local innovation capacity and as leading agencies for stakeholder engagement and value capture. The efficiency of regional authorities is projected to come from their knowledge and practice of intense triple helix interactions, as regions in the UK that have lost their regional authorities are flagged in the literature as having difficulties in generating sustainability of knowledge transfer across the university-industry interface. The paper also promotes the idea that the best way to harness triple helix interactions is at the regional level of governance and policy intervention, where synergies from stakeholder coalitions and spillovers emerge.

The second paper by Aranguren, Guibert, Valdaliso and Wilson discusses the question of whether the regional universities and academic institutions can lead the triple helix. The authors present a detailed account of the academic-led evolution of triple helix interactions in the Basque country region of Spain. An important outcome from this exploration is the discussion of the complexity of the system, which they argue requires a rationalisation of agents and clarification of roles, as well as the development of an effective monitoring and evaluation system that facilitates learning among agents and policy-makers.

This paper also focuses on the intermediation function by looking at the departmental structure established by Deusto University for specialised knowledge transfer under the three domains of technologies, social innovation and competitiveness. The case of Orkestra Institute of Competitiveness as a spin-off organisation from Deusto University is supported with evidence that the university impact is measured through research, publications and training courses. It is demonstrated that through these activities the institute has developed a broad outreach to a variety of local and global organisations, among which universities, firms, regional and local governments, local development agencies, cluster organisations, international organisations and international governments. The paper concludes with the insightful statement that sustainable impact from the academia engagement with regions should be pursued through sustainable funding of the lead agents.

The paper by Gustavsson and Nuur explores the implementation and impact of nationwide policy on introducing industry PhD programmes. The authors report empirical evidence for three industry-university initiatives involving 9 universities, 39 companies and 57 doctoral students. The three cases confirm the strong regional affiliation between the participating universities and businesses and the positive impact of, what the authors call, ‘dynamics of regional triple helices’. The authors refer to the

concept of 'endogenous regional growth paradigm', transposing the generic concept of endogenous growth at a regional level. This is justified with two arguments: first, that in non-metropolitan areas, regional universities educate labour and provide skills to the local economy to a greater extent, compared with metropolitan universities, and second, that innovative and entrepreneurial universities can become key architects and drivers of regional development (Etzkowitz and Klofsten, 2005).

This potential is explored by all key regional actors in Sweden as both universities and industry actors hold high expectations from their collaboration. The empirical evidence, collected by Gustavsson and Nuur demonstrates the diversity of short-term and long-term benefits that are generated through collaborative PhD education. The problem of the sustainability of funding, however, is highlighted again, with different modes of funding being seen to pose different challenges to collaborating institutions, and all three successful Swedish cases of collaborative PhD programmes show complementary funding arrangements from firms and from knowledge foundations. The critical success factors, however, lie in proper strategic engagement, management support, selection and recruitment strategies, and joint formulation of the research topic and research supervision. The paper develops an argument that the success of the programme derives from a micro-scale management and adaptations, rather than from macro-level policy and support measures.

The contribution by Gebhardt and Stanovnik in contrast investigates the macro-level drivers for triple helix dynamics – such as European regional policies and the support for regional innovation systems, or what they call 'multi-level governance'. The authors discuss the translation of strategic objectives and policy measures across the three distinctive levels of the European innovation and integration policies, the national level of structural co-alignment and smart specialisation, and the regional level of innovation cluster initiatives. The paper follows the logic that regional competitiveness is driven very much by cluster competitiveness, and the ability of regions to channel European and national funds. The paper is particularly focused on the institutional constraints both at regional and national levels that hamper the implementation of smart specialisation strategies. The authors emphasise the need for organisational and institutional changes both at regional and at national level. The efficiency argument for governance intervention hence questions both the capacity of regional and national authorities in driving innovation at a system level. At the level of central government the main inefficiencies are attributed to sectoral division and other administrative division across ministries and government agencies, responsible for the implementation of the complex suit of EU policies. The inefficiencies in government are associated with piecemeal policy solutions, and *ad hoc* implementation. On the other side, poor implementation results

are associated with weak entrepreneurial qualities both in universities and firms. Therefore, the lack of a perceived entrepreneurial culture drives poor innovation performances at national, regional and organisational levels.

Kerry and Danson investigate the role of the catapult centres in the UK as embodiments of the public policy to support regional innovation systems. The paper investigates the sources of competitiveness and competitive advantage at the regional level, and concludes that there is a strong sectoral and geographic dimension. Regional competitiveness is hence determined by the local presence of high tech industry, which is potentially oriented towards the internal market. The innovation capacity of a region is determined by the human resources and their strategic upgrade through local education providers.

The paper examines the links between open innovation and the triple-helix model. The paper emphasizes the localized functional performance of the catapult centres, as intermediaries translating policy objectives and resources into contextualized activities, and spotlights the importance of boundary-spanning intermediaries and stakeholder engagement. It develops this further by presenting a conceptual model of how the triple-helix innovation occurs within regional innovation systems (RIS) that are underpinned by open Innovation principles. The paper offers an agenda for taking forward these twin concepts of open innovation in a triple helix context.

4. Conclusion and Future Directions

Triple Helix Theory comprises of an eclectic body of scientific fields, focused on complex socio-economic challenges and in the search for Triple Helix solutions. Although the fundamental basis of the model is embedded in political economy, a variety of studies have brought forth a galaxy of multidisciplinary approaches to theorising about technological and institutional change, as well as government leadership and response to globalisation challenges, or building R&D capabilities within the public and the private sectors (Todeva and Etzkowitz, 2013). Both triple helix and regional development theorising employ arguments from public policy and innovation theories, cluster development and knowledge management theories, or even from alliance and networks theories. The conceptual and empirical integration of all these distinctive approaches is still overdue, and poses a significant challenge to scholarly work.

The papers in this special issue show four distinctive cases of triple helix interactions in the context of European regional innovation policies, national innovation infrastructure, local triple helix engagement for the delivery of industrial PhD research in Sweden, and local and global challenges for entrepreneurial universities in the Basque region in Spain. The papers develop the concept of the triple helix at the sub-national, and specifically regional level. The theoretical discussion first lays the foundations for the later

exploration of the application of the concept in contrasting environments, sectors and jurisdictions. This collection therefore presents a contribution to the literature which develops the triple helix framework for analysis and policy delivery down to the region and out into new contexts. It also demonstrates how other models and characterisations of interactions and collaborations between institutions are associated with the triple helix and can enrich its application, but also highlight its shortcomings, when political and economic powers are concentrated and centralised within national, sectoral and global economies.

The papers also raise significant questions about the theory and practice of multilevel governance; the impact of shared resources on the public and the private sector; the involvement of triple helix actors in specific innovation activities, such as PhD research; the strategic co-alignment of local triple helix actors and stakeholders around development objectives; the distinction between regional and national actors when it comes to open innovation; the impact of regular financing on intermediary and support organisations, delivering public value; or the cultural and institutional boundaries for regional innovation and growth. These are all evolving issues for policy and research and will benefit from further comparative and coherent consideration.

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